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(12) United States Patent Zhang et al.

(54) METHODS AND ELECTROLYTES FOR ELECTRODEPOSITION OF SMOOTH FILMS

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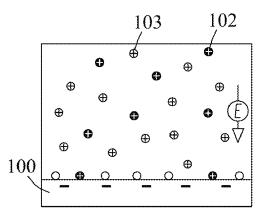
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(56) References Cited

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(57) ABSTRACT

Electrodeposition involving an electrolyte having a surfacesmoothing additive can result in self-healing, instead of selfamplification, of initial protuberant tips that give rise to roughness and/or dendrite formation on the substrate and/or film surface. For electrodeposition of a first conductive material (C1) on a substrate from one or more reactants in an electrolyte solution, the electrolyte solution is characterized by a surface-smoothing additive containing cations of a second conductive material (C2), wherein cations of C2 have an effective electrochemical reduction potential in the solution lower than that of the reactants.

19 Claims, 5 Drawing Sheets

